

**DISTRIBUTION EXTENSION OF TWO LESSEPSIAN MIGRANTS FOUND IN THE MARINE AREA OF THE ISLAND OF RHODES (AEGEAN SEA, GREECE)** Maria CORSINI, National Centre of Marine Researches, Aquarium and Hydrobiological Station of Rhodes, Ko str. GR-851 00 Rhodes, & Panos Stavros ECONOMIDIS, Aristotle University, School of Biology, Laboratory of Ichthyology, Box 134, GR-540 06 Thessaloniki, GREECE. [psecon@bio.auth.gr].

**RÉSUMÉ.** - Extension géographique de deux espèces de poissons migrants lessepsiens trouvées dans la région marine de l'île de Rhodes (Mer Égée, Grèce).

Grâce à de nouvelles captures, la présence de *Pteragogus pelycus* et de *Sphyræna chrysotaenia*, originaires de la Mer Rouge (migrants lessepsiens) et de *S. viridensis* espèce atlantique, est signalée dans le sud-est de la mer Égée (Dodécanèse). *P. pelycus* a déjà été signalée le long des côtes israéliennes, tandis que *S. chrysotaenia* a une distribution plus vaste atteignant les côtes libanaises et égyptiennes. *S. viridensis*, malgré son origine atlantique, a une distribution plus levantine en Méditerranée, car sa présence n'est signalée que sur les côtes israéliennes et libanaises, et en Mer Égée. Ces observations élargissent la distribution de ces trois espèces en Méditerranée.

**Key-words.** - Labridae, *Pteragogus pelycus*, Sphyrænidae, *Sphyræna chrysotaenia*, *Sphyræna viridensis*, MED, Aegean Sea, Lessepsian migrants.

Although the Mediterranean is regarded as a well studied enclosed sea, some new taxa of marine animals, including fish, are being recorded each year. Apart from the undescribed endemic elements, there are three entrances by which the fish fauna of this sea is enriched: the Suez canal for Red Sea elements, the Gibraltar strait for Atlantic species and Bosphorus-Dardanelles for Pontic fish. The sea around the island of Rhodes is situated between two large regions, the South Aegean Sea and the Levantin Basin. Water masses of

this area are characterised by high temperature and salinity values, even in deep waters (Pancucci-Papadopoulou, 1992). According to Siokou-Frangou and Papathanassiou (1989), the surface temperature varies from 17.6°C (February) to 26.4°C (August) in this region, while under the thermocline the temperature is always higher than 14.7°C. The salinity is about 39 PSU in all seasons. These abiotic factors favour mainly fish coming from the first entrance. It is customary to call fish species originating from the Red Sea "Lessepsian" migrants, which once they reach the Mediterranean they normally follow the Asiatic shore line before entering the water masses around the Dodecanese islands. Long ago a number of nine Lessepsian migrant fish species were recorded in the SE Aegean Sea (see Economidis, 1973). Meanwhile, two more have also been added in the area (Ben Tuvia, 1978; Papaconstantinou and Caragitsou, 1986; Papaconstantinou, 1990). This study presents other two new Lessepsian migrants from the sea around Rhodes, and one of an Atlantic species with poorly known distribution in the Mediterranean.

#### Results

*Pteragogus* species was identified following Randall (1981, 1986), and those of *Sphyræna* according to Tortonese (1975), De Sylva and Williams (1986), Ben-Tuvia (1986) and Bauchot (1987).

#### *Pteragogus pelycus* Randall, 1981

##### Material

Six specimens as follows: 1 spm, 80.8 mm SL, 3 Sep. 1992, strait between Symi and Nimos (Fig. 1) caught by a fishing-rod at 10 m depth in a region rich with algae; 1 spm, 77.6 mm SL, 21 Oct. 1993 (surface sea water temperature 22.9°C), about 100 m off the Hydrobiological Station of Rhodes in a rocky bottom with algae; 1 spm, 58.1 mm SL, 18 Oct. 1994 (surface sea water temperature 24.9°C), location same as previous; 1 spm, 78.6 mm SL, 26 Jan. 1995 (surface sea water temperature 17°C), location same as previous; 2 spms, 54.9 and 66.1 mm SL respectively, 1 Mar. 1994, off of Kritika (NW coast of Rhodes), caught by trawl-net. Their bodies were slightly deformed. A specimen remained living in the aquarium for a few days.

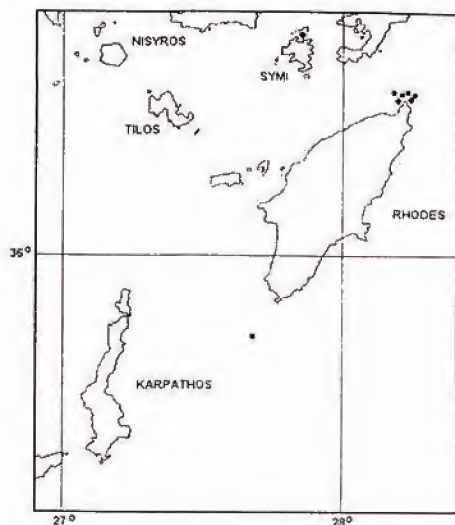


Fig. 1. - Map of the Rhodes region showing the localities where the specimens were caught. ♦: *Pteragogus pelycus*; ■: *Sphyræna chrysotaenia*; ●: *Sphyræna viridensis*.



Fig. 2. - Specimen of *Pteragogus pelycus*, 58.1 mm SL, captured off Rhodes on 18 October 1994.

#### Description

D: XI + 9; A: III + 9; P: 12 (11); V: I + 5; C: 12. The body is compressed, oblong and covered with large cycloid scales. Scales on cheeks and opercles are present, but absent in the interorbital, snout and chin. In the male the second ray (first soft ray) of the ventral fin is extended and reaches about the end of the anal fin, while in the female it is shorter (Randall, 1981). In the male the forehead is high and convex above the eye, while the snout is slightly turned up. In the female the dorsal profile of the head is straight, less pronounced

than in the male. The lateral line is complete. Two pairs of recurved canine teeth anteriorly in jaws, the second pair large and out curved. Serrae on the posterior margin of preoperculum are present and the caudal fin is rounded.

The colour of the specimen preserved in formalin is grey-brown, with shades of blue. The head is dotted with very small white spots and with white streaking (bars) around the eyes. The membranes of the dorsal, caudal and anal fins are dotted with black spots on their edges. The membranes of the three first spines of the dorsal fin



present large black spots. An ovoid black spot is present besides the eye, on the preoperculum. The dorsal and anal spines and rays, the preoperculum and the chin as well are blue. Dark spots along the lateral line are also present. The colour of living fish is red-orange-brown (Fig. 2). There is a large black spot on the preoperculum and a black spot on each of the first two or three interspinous membranes of the dorsal fin. The lateral line is signed by dark spots.

#### Remarks

Samples of the species are collected regularly by trawl-nets during all seasons. Five more individuals have been living in a closed system aquarium at a constant temperature of 20°C since August 1995. It has been observed that the species is not favoured by low temperatures (12–13°C). The living specimens appreciate principally a carnivorous diet, which includes shrimps, mussels and small pieces of squids and fishes.

#### *Sphyaena chrysotaenia* Klunzinger, 1884

##### Material

Ten specimens, 196–253 mm SL, collected by a trawl on Jul. 1995, in the region off Ixia (Fig. 1) along the NW coast of Rhodes and a single specimen collected on 7 Aug. 1995, off the Hydrobiological Station of Rhodes (NE coast of the island). No individual survived after fishing.

##### Description

D1: V, D2: I + 9; A: II + 8; P: 12–13. Two gillrakers. Colour brown-grey above, silvery below, with yellowish shadings. Yellowish shadings also in second dorsal, pectoral and caudal fins. In all the measured specimens, the D1 height was greater than the post orbital head length, but D1 height was smaller than the distance between D1 and D2. The pectoral fins just reach or just pass D1 origin.

#### *Sphyaena viridensis* Cuvier, 1829

##### Material

Nine specimens as follows: 1 spm, 390.0 mm SL, 26 Jan. 1995, caught by a trawl, about 100 m off the NE beach of the town of Rhodes (Fig. 1), at a depth of 20 m, on a rocky bottom rich with algae; 2 spms, 333–391 mm SL, 10 Mar. 1995, location and method same as previous; 1 spm, 592.0 mm SL, 22 Mar. 1995, captured by

net in the area between the islands of Rhodes and Karpathos; 5 spms, 150–405 mm SL, Jul. 1995, collected by trawl, in the region off Ixia, along the NW coast of the island of Rhodes.

All the specimens caught by trawl were living, but they survived at a maximum of two days under controlled conditions because of their sensitivity in captivity (Bini, 1968).

##### Description

D1: V; D2: I + 9; A: II + 8. Scales on posterior margin of preoperculum and gillrakers on the branchial arches are missing. The pelvic fins is inserted below the first dorsal fin, while the tip of pectoral fin does not reach the pelvic fins. The colour is dark above and silvery below. There are dark bars across the upper part of the body, extending anteriorly slightly below the lateral line, and a yellow band parallel to the lateral line.

##### Remarks

The largest specimens were found in the open sea, while the smaller individuals were caught near the coast. This is a typical behavior of *Sphyaenidae* previously described by Ben-Tuvia (1986) and Bauchot (1987). It should be underlined that the species seems to live close to *Sphyaena sphyaena*. During the trawl fishing of July 1995 a specimen of the latter was caught together with the five *S. viridensis* (see above: material).

##### Discussion

The presence of *Pteragogus pelycus* in the Eastern Mediterranean has firstly been reported on the Israeli coasts (Golani and Sonin, 1992), while *Sphyaena chrysotaenia* seems to have entered from the Red Sea fairly previously, because it had already reached the coasts of Israel, Lebanon and Egypt (Ben-Tuvia, 1986) and recently more westwards, to Malta (Golani, in press). It is remarkable that *P. pelycus* was signalled in Dodecanese almost simultaneously as on the coasts of Israel, while *S. chrysotaenia* reached the waters of Rhodes in an indeterminate time after a relatively long time process of spreading. The occurrence of two new fish species originating from the Red Sea in the area of Rhodes enlarge the list of Lessepsian migrants in Greek coasts, which now includes 13 species. However, despite the fact that abiotic conditions of sea masses around Dodecanese islands seem to favour rather thermophilous fish, this number is regarded to be low in comparison with the total number of 55 Lessepsian migrant

fish which have been registered until now along the coasts of Israel (Golani, 1996). Obviously, this disagreement needs to be more investigated although some preliminary approaches have already been made. For instance, these species have to face single or combined unfavourable ecological conditions (water temperature, substratum, currents, trophic conditions, etc.) when following the narrow continental shelf of the Anatolian coasts as the main way for their westward spreading. However, once reaching the continental shelf of the Dodecanese islands, they usually remain there permanently, often forming important exploited populations (Stergiou, 1988). For some of them, such as the *Upeneus moluccensis* during the 40's, there was an initial population explosion (see Laskaridis, 1948) which was followed by an incomprehensible dramatic fall, so that nowadays this species can be considered as rather rare in the area. The substantial role the unfavourable factors (mainly sea currents and continental shelf isolation) played in establishing the Lessepsian migrants in the Cretan shelf, where only two such fish were found, is discussed by Tsimenides *et al.* (1991). Nevertheless, in the adjacent Dodecanese shelf, abiotic factors are more favourable and the Lessepsian migrant fish are frequent in the surrounding seas. Thus, the collection of the Hydrobiological Station of Rhodes comprehends enough specimens of *Sargocentrum rubrum*, *Siganus rivulatus*, *S. luridus*, *Stephanolepis diaspros*, *Upeneus moluccensis*, *Saurida undosquamis* and *Pempheris vanicolensis*, some of which, such as *S. luridus*, *S. rivulatus* and *S. diaspros* are caught regularly by trawl-nets and are maintained alive in the aquaria for the public.

The presence in the Mediterranean of *Sphyraena viridensis* which, according to Tortonese (1975) is an Atlantic species, was first been reported from Israel (Ben-Tuvia, 1971) and Lebanon (George *et al.*, 1971). Its occurrence in the South Eastern Aegean Sea confirms the hypothesis that this species has a wider distribution, mainly in eastern and south Mediterranean, but it is often confused with the closely related Mediterranean species *Sphyraena sphyraena* (Ben-Tuvia, 1986).

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